Claims

- (1) A method of fabricating a self-assembled monolayer of a substance on a substrate comprising depositing the substance on the substrate using compressed carbon dioxide as the solvent medium for the substance.
- (2) A method as claimed in claim 1, wherein the pressure and/or temperature of the compressed carbon dioxide is/are selectively controlled so as to enhance the density of the self-assembled monolayer on the substrate.
- (3) A method as claimed in claim 1 comprising the use of a co-solvent in combination with the compressed carbon dioxide.
- (4) A method as claimed in claim 3, wherein the co-solvent comprises at least one of H₂O, CH₃OH, CF₃OH, CF₃CH₂OH, CF₃CF₂OH, (CF₃)₂CHOH, CH₄, C₂H₄, C₂F₆, CHF₃ CCIF₃, C₂H₆, SF₆, Propylene, Propane, NH₃, Pentane, iPrOH, MeOH, EtOH, iBuOH, Benzene, Pyridine.
- (5) A method as claimed in claim 1, wherein the substrate comprises a metallic substance.
- (6) A method as claimed in claim 5, wherein the metallic substance comprises at least one of gold, silver, copper, iron, mercury, palladium, gallium arsenide, ferrous oxide, indium tin oxide.
- (7) A method as claimed in claim 6, wherein the substance comprises a semi-fluorinated sulphur containing compound of the formula:

19
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[F₂C]_m
\
CF₂
/
[H₂C]_n

Where X comprises R-SH, RS-SR or R-S-R, where R denotes the rest of the molecule;

/

 \mathbf{X}

Y comprises a functional group; and

m and n denote respectively the number of fluorinated and non-fluorinated carbon atoms.

- (8) A method as claimed in claim 7, wherein X comprises a disulphide of sulphur.
- (9) A method as claimed in claim 7, wherein X comprises a thiol.
- (10) A method as claimed in claim 7, wherein Y comprises a CF₃ functional group.
- (11) A method as claimed in claim 7, wherein m and n lie within the range of 1 to 20.

- (12) A method as claimed in claim 11, wherein m and n lie within the range of 5 to 10.
- (13) A method as claimed in claim 12, where m is 8 and n is 10.
- (14) A method as claimed in claim 7, wherein Y further comprises at least one of vinyl, styryl, acryloyl, methacryloyl or alkyne in combination with a spacer group.
- (15) A method as claimed in claim 14, wherein the spacer group comprises at least one of CH₂ or CF₂.
- (16) A method as claimed in claim 1, wherein the substrate comprises at least one of glass, mica, SiO₂, Al₂O₃, Ga₂O₃ or ITO.
- (17) A method as claimed in claim 16, wherein the substance comprises a semi-fluorinated silane derivative of the formula:

Y

1

 $[F_2C]_m$

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 CF_2

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 $[H_2C]_n$

\

 CH_2

1

Si

where Y comprises a functional group; and

m and n denote respectively the number of fluorinated and nonfluorinated carbon atoms.

- (18) A method as claimed in 17, wherein Si comprises a trialkoxy derivative.
- (19) A method as claimed in claim 18, wherein Si comprises at least one of SiCl₃, Si(OCH₃)₃, Si(OCH₂CH₃)₃, Si(OCH₃)₂Cl or Si(CH₂CH₃)₂Cl.
- (20) A method as claimed in claim 17, wherein Y comprises a CF₃ functional group.
- (21) A method as claimed in claim 17, wherein m and n lie within the range of 1 to 20.
- (22) A method as claimed in claim 21, wherein m and n lie within the range of 5 to 10.
- (23) A method as claimed in claim 22, wherein m is 6 and n is 1.
- (24) A method as claimed in claim 17, wherein Y further comprises at least one of vinyl, styryl, acryloyl, methacryloyl or alkyne in combination with a spacer group.
- (25) A method as claimed in claim 24, wherein the spacer group comprises at least one of CH₂ or CF₂.
- (26) A method as claimed in claim 1, wherein the self-assembled monolayer has an ellipsometry thickness of about 30Å and a water contact angle of about 110°.
- (27) An inkjet head comprising a self-assembled monolayer as claimed in any one of claims 1 to 15 or claim 26, when appendant to any one of claims 1 to 15.

- (28) An electronic, optical or optoelectronic device comprising a self-assembled monolayer as claimed in any one of claims 1 to 5 or claims 16 to 26 or claim 26 when appendant to any one of claims 1 to 5, or 16 to 25.
- (29) A device as claimed in claim 28 comprising a thin film transistor or an organic semiconductor device, or a light emitting diode.
- (30) A device as claimed in claim 29, wherein the light emitting diode comprises an organic polymer light emitting diode.